A New Species of *Humboldtiana* (Helminthoglyptidae) from Coahuila, Mexico

BY

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(1 Plate; 1 Text figure)

A RECENT COLLECTION of land snails from Coahuila, Mexico by Dr. David H. Riskind produced a series of large specimens of *Humboldtiana* which, upon cursory examination, appeared to be referable to *H. montezuma* Pilsbry. However, investigations of the genitalia, and a comparison of the shell morphology of the Coahuila specimens to the holotype and 2 paratypes of *H. m. montezuma* reveal that the Riskind specimens represent an undescribed species of *Humboldtiana.*

Humboldtiana riskindi Fullington & Zimmerman, spec. nov.

(Figures 1 to 3 and 7)

Description of Holotype: Shell large and globose; spire elevated with all whorls visible from apertural view; aperture oriented obliquely; embryonic whorl smooth and white; shell entirely devoid of granulations; last ½ turn of embryonic whorl with spiral striae merging with radial striae; remainder of whorls with interrupted, profuse, white striae separated by pronounced grooves; striae continuing over body whorl and into umbilicus and extending through shell forming shallow ridges on inner side; well-developed parietal callus with columella broadly reflected over umbilicus partially concealing the latter in a basal view; parietal wall covered with translucent nacre; 3 narrow, faint bands of brown pigment on body whorl, bottom band disappearing at insertion of upper lip and 2 bands continuing to embryonic whorl; ground color maple; inner aperture wall walnut brown with spiral bands distinctly visible from within; living animal slate gray above, fading to dusky gray or black laterally; sole of foot blue-gray; skin texture heavily corrugated.

Measurements: The holotype is 49.8mm in diameter, 45.1mm in height, and has 4½ whorls. Height and diameter of the aperture are 34.5 and 32.7mm, respectively.

Genitalia: Penis relatively long, 13.0mm, and bulbous (Figure 7); epiphallus short (8.7mm), less than ⅛ the length of the flagellum; penis with 5 heavy, longitudinal folds extending up to ½ the penial wall; penial retractor inserted just above the junction of epiphallus and penis; verge short and papilliform with 7 finger-like papillae; 4 dart sacs, equal in size and widely separated (5.0mm) from mucous gland; vagina long, 15.7mm.

Type Locality: Coahuila, Mexico, 17km E Castaños in Cañon Obscuro Chiquillo, Sierra de la Gloria, at 26° 47′25″ N Lat., 101°17′45″ W Long. Approximate elevation 1300m. D. H. Riskind and T. Wendt, 7 September 1976. The specimens were found aestivating on a north-facing slope of a massive, limestone cliff in a narrow gorge of the Cañon. Vegetation in the Cañon is primarily brushy Tamaulipan woodland with oaks, *Quercus glaucoides*; pistacio, *Pistacia* sp.; chapotillo, *Amyris marshii*; manzanita, *Colubrina gregii*; and guajillo, *Acacia berlandieri.*

Disposition of Specimens: Holotype deposited in Dallas Museum of Natural History, Invertebrate Type Collection No. 5357. Paratypes deposited in the United States National Museum.

Discussion: Members of the helicoid genus *Humboldtiana* are among the largest terrestrial gastropods in North America. The genus includes 27 recognized species distributed from the Trans-Volcanic Belt of central Mexico northward to western Texas (BURCH & THOMPSON, 1957;

Cheatum, 1972; Pilsbry, 1939, 1948; Pratt, 1971; present study).

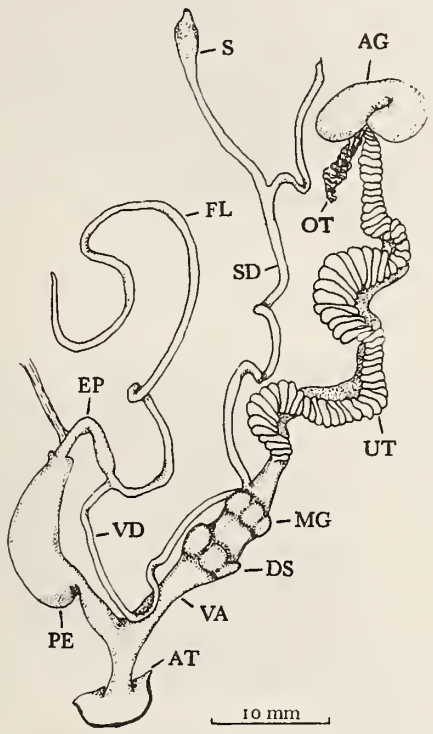

Figure 7

Humboldtiana riskindi Fullington & Zimmerman, spec. nov.

Genitalia of paratype, DMNH 5358

AG – Albumen gland AT – Atrium DS – Dart sac
EP – Epiphallus FL – Flagellum MG – Mucous gland
OV – Ovotestis PE – Penis S – Spermatheca
SD – Spermathecal duct UT – Uterus VA – Vagina
VD – Vas deferens

Ten species are found in Texas, and all occur as insular relicts at elevations above 1200m in isolated mountain ranges west of the Pecos River (Burch & Thompson, 1957; Cheatum, 1972; Pratt, 1971). The remaining Mexican forms are distributed in Mexico, D. F, Hidalgo, and Vera Cruz in the Trans-Volcanic Belt; Queretaro, Guanajuato, San Luis Potosi, and Tamaulipas in the Sierra Madre Oriental; Zacatecas, Durango, and Chihuahua in the Sierra Madre Occidental; and Nuevo Leon and Coahuila in isolated mountain ranges of the Mexican plateau (Burch & Thompson, *op. cit.*). The diversity of available habitats and climatic effects of post-Pleistocene isolation at higher elevations have, no doubt, contributed to the evolution of the diversity of *Humboldtiana* forms in this region.

Humboldtiana riskindi would appear to belong to the loose assemblage of species occurring in the Sierra Madre Oriental and resembles *H. m. montezuma* in certain aspects of shell morphology, including large size and presence of the white striae. In fact, the means for diameter and height of the shell and aperture of the holotype and 2 comparably-sized paratypes of *H. riskindi* are similar to those of the holotype and one paratype of *H. m. montezuma* available to us. Additionally, certain features of the genitalia, including the lengths of the vagina and atrium, spermatheca and duct, and diverticulum of the spermatheca compare favorably with values provided for *H. m. montezuma* by Pilsbry (1948). There are, however, several striking differences which provide distinctness to *H. riskindi*. *Humboldtiana riskindi* differs from *H. m. montezuma* in having white striations higher and more regularly and narrowly spaced; no granulations, these being prominent in *H. m. montezuma*; pigmented bands on the body whorls; depressed whorls, with a ratio of height to diameter of the shell averaging 0.94 (0.91 in *H. m. montezuma*); a ground color of light maple and not vinaceous brown; a well-developed parietal callus and columellar lip; the basal whorl less inflated and rounded, and the columellar lip exposing the umbilicus; the distance across the parietal wall from the insertion of the palatal portion of the lip to the point of insertion of the basal lip narrow, averaging 15.3mm (22.6mm in *H. m. montezuma*); a large, bulbous penis; a short epiphallus, averaging 11.1mm (32mm in *H. m. montezuma*); a long flagellum, averaging 65.3mm (40mm in *H. m. montezuma*); and the dart sacs widely separated from the mucous glands. The most diagnostic features of *H. riskindi* include the lack of granulations, prominent white striae, pigmented bands on the body whorls, a large, bulbous penis, a short epiphallus, and a wide separation between the dart sacs and mucous glands.

Features of the soft anatomy and geographic distribution of *Humboldtiana riskindi* do not provide a clear picture of its taxonomic affinities. The genus *Humboldtiana* has been divided into 2 groups based on the relationship of the dart sacs to the mucous glands (Burch & Thompson, 1957), although Solem (1974) cautions investigators that this feature shows some intraspecific variation. Species such as *H. buffoniana* (Pfeiffer), *H. chrysogona* Pilsbry, 1948, *H. fortis* Pilsbry, 1940, *H. montezuma* Pilsbry, 1940, *H. potosiana* Pilsbry, 1927, *H. striata* Burch & Thompson, 1957, and *H. ultima* Pilsbry, 1927 all have the

mucous glands situated closely above the dart sacs. Furthermore, certain forms of this group are characterized by a conspicuous apical chamber in the penis and a short verge (Burch & Thompson, 1957). In contrast, *H. texana* Pilsbry, 1927, *H. chisosensis* Pilsbry, 1927, *H. fasciata* Burch & Thompson, 1957, *H. fullingtoni* Cheatum, *H. globosa* Burch & Thompson, 1957, and *H. agavophila* Pratt, all have widely separated mucous glands and dart sacs. Most of these also have a long verge and only a vestige of the apical chamber of the penis (Burch & Thompson, 1957; Pratt, 1971). *Humboldtiana riskindi* would appear to have features of both groups, *i. e.*, a short verge but a wide separation between the mucous glands and dart sacs and a vestigial apical chamber of the penis. The fact that *H. riskindi* and *H. m. montezuma* differ significantly in 2 of the features indicates the 2 species should be placed in different groups established by Burch & Thompson, (*op. cit.*).

Additionally, the distributions of *Humboldtiana riskindi* and *H. m. montezuma* are not indicative of taxa that are closely related. The latter occurs at about 3000m in southeastern Nuevo Leon in the Sierra Madre Oriental. This continuous cordillera is habitat for at least 8 species of *Humboldtiana* (Burch & Thompson, 1957). *Humboldtiana m. montezuma* and *H. m. inferior* Pilsbry, 1948 and 3 other species, *H. fortis*, *H. chrysogona*, and *H. nuevoleonis* Pilsbry, 1927, occur at the northern end of the cordillera, which extends only into southeastern Coahuila. The type locality of *H. riskindi*, on the other hand, is one of several isolated mountain ranges, the Sierra de la Gloria, that extend in a northwest-southeast direction from the Sierra del Carmen, along the Rio Grande River, to the Sierra Madre Oriental in southeastern Coahuila. Geographically, the Sierra de la Gloria lies in an intermediate position between populations of *Humboldtiana* in the Trans-Pecos of Texas and the Sierra del Carmen, and forms such as *H. fortis*, *H. chrysogona*, and *H. nuevoleonis* in the northern Sierra Madre Oriental. The latter 3 species occur between populations of *H. riskindi* and *H. m. montezuma* and bear no external or anatomical similarity to *H. riskindi*.

Therefore, we are unable to completely elucidate the taxonomic position of *Humboldtiana riskindi*. Anatomically it is unique, resembling *H. m. montezuma* in its large size, but being most similar to *H. texana*, *H. chisosensis*, *H. fullingtoni*, *H. agavophila*, *H. fasciata*, and *H. globosa* in morphology of the genitalia. Additional studies utilizing several forms of *Humboldtiana* in an electrophoretic analysis of protein variation in the genus should provide some insight into this problem. A preliminary report of this research is in preparation.

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Explanation of Figures *1* to *6*

Figure *1*: Holotype, DMNH 5357 of *Humboldtiana riskindi* Fullington & Zimmerman, spec. nov. × 1

Figure *2*: Holotype, DMNH 5357, of *Humboldtiana riskindi* Fullington & Zimmerman, spec. nov. × 1

Figure *3*: Holotype, DMNH 5357, of *Humboldtiana riskindi* Fullington & Zimmerman, spec. nov. × 1

Figure *4*: Holotype, ANSP 164062, of *Humboldtiana montezuma* Pilsbry, 1940 × 1

Figure *5*: Holotype, ANSP 164062, of *Humboldtiana montezuma* Pilsbry, 1940 × 1

Figure *6*: Holotype, ANSP 164062, of *Humboldtiana montezuma* Pilsbry, 1940 × 1